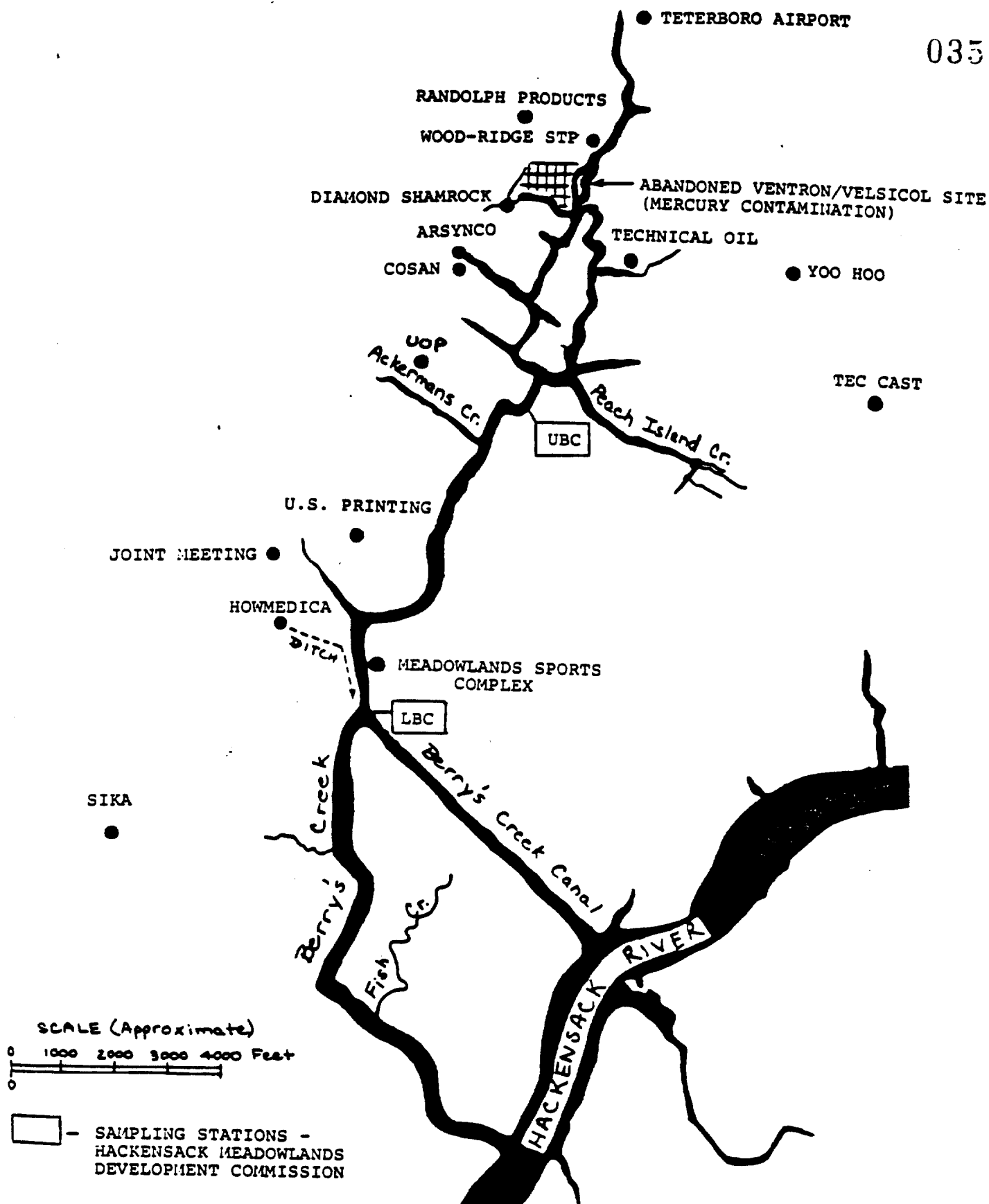


BERRY'S CREEK - POINT SOURCES

There are 14 point source discharges of record to Berry's Creek. Among these wastewater discharges 11 are characterized as cooling water or stormwater runoff, 1 is characterized as process wastewater and the remaining 2 are municipal.

According to 1983 NPDES discharge monitoring data approximately 96 percent of the point source organic loading (in terms of biochemical oxygen demand - BOD) is attributable to the Joint Meeting facility. Although the Joint Meeting's discharge is characterized as municipal, 10 percent of the flow and 90 percent of the pollution loading to the plant is of industrial origin. (according to Ken Goldstein of the NJDEP).



BERRY'S CREEK - POINT SOURCES

BERRY'S CREEK

Point Sources and Pollution Loadings*

Point Source	Waste Type	Average Flow (MGD)	BOD** (kg/day)	TSS (kg/day)
Joint Meeting	municipal (significant industrial)	2.30	3750	1370
Wood-Ridge	municipal	0.565	72	83
Teterboro	stormwater runoff	N/A	COD 16 mg/l	12 mg/l
Randolph Products	cooling	0.0006	0.18	0.39
Diamond Shamrock	cooling water	2.59	34	34
Arsynco	non-contact cooling	0.015	COD 0.83	N/A
Technical Oil	non-contact cooling	0.068	TOC 0.81	N/A
Yoo Hoo	cooling water	0.015	TOC 1.79	N/A
Cosan	non-contact cooling	001 .091	COD 8.99	0.92
		002 .016	0.35	0.07
Tec Cast	process	0.0015	COD 0.08	0.14
U.S. Printing	non-contact cooling	0.015	TOC 0.27	N/A
Howmedica	cooling water	0.12	N/A	N/A
Sika	cooling water	0.080	COD 3.93	1.11
Meadowlands Sports Complex	stormwater runoff	N/A	N/A	N/A

* Based primarily on 1983 NPDES DMR data values.

** BOD unless otherwise indicated.

IV. ENVIRONMENTAL EVALUATION/POTENTIAL ENVIRONMENTAL IMPACT

The NJDEP has adopted water quality standards for the Hackensack River and its tributaries. Berry's Creek, into which the Joint Meeting plant discharges, and the Hackensack River between Overpeck Creek and Berry's Creek, into which the Authority treatment plant discharges, are classified as TW-2. The designated uses for class TW-2 waters include: "secondary contact recreation; the propagation and maintenance of fish populations; the migration of anadromous fish; the maintenance of wildlife and other reasonable uses."

The water quality standards which are designed for enhancing and maintaining conditions suitable to fish include pH, suspended solids, dissolved oxygen (DO), temperature and heat dissipation areas, toxic or hazardous substances (generally determined by use of acute toxicity tests), un-ionized ammonia, total residual chlorine, and various pesticides and polychlorinated biphenyls (PCBs). Most of these standards for TW-2 waters are described in the March 3, 1981 New Jersey Surface Water Quality Standards (N.J.A.C 7:9-4.7(d)) presented as Appendix A.

The Hackensack River downstream of Berry's Creek is classified as TW-3. The designated uses for class TW-3 waters include: "secondary contact recreation; the maintenance of fish populations; the migration of anadromous fish; the maintenance of wildlife and other reasonable uses." The water quality standards for this classification are also described in the New Jersey Surface Water Quality Standards (Appendix A).

As established in the April 1979 Northeast New Jersey Water Quality Management Plan, the NJDEP considers the quality of these waters as "Water Quality Limited".¹ The "Water Quality Limited" designation is applied to any segment of the waterway in which the water quality does not meet applicable standards and is not expected to meet applicable standards even after "best practicable treatment" of the point source effluents within the segment are achieved. Water Quality Limited segments require a greater effort in determining the level of detail necessary for pollution abatement investigations.

The Hackensack River drains the heavily developed northeastern region of New Jersey. Despite the origin of this river and its major tributaries in sparsely developed areas, water quality declines from generally good in the upper freshwaters to poor in the estuary and lower freshwaters. Table 3, taken from the New Jersey 1982 State Water Quality Inventory Report (hereinafter referred to as 305(b) Report), presents the trends in water quality data and the subsequent determination of overall stream water quality for the Hackensack River for the period of 1977 to 1981. According to this Table the conditions in the Hackensack River remain stable and unchanged, with an overall water quality of poor. This is particularly true with respect to the tidal Hackensack River. Low DO and high BOD, elevated water temperatures (from power plant cooling water discharges), nutrients, ammonia, fecal coliform, and metals contamination prevent Federal fishable and swimmable goals from being met. Fish tissue from the lower Hackensack contained levels of cadmium, lead and nickel above the State mean. A sample from the forage fish mummichog contained the highest recorded levels in the State.²

TABLE 3 New Jersey Surface Water Quality Trends - 1977 to 1981

Stream	DO	Total P	NH ₃	TDS	BOD	DO Sat.	Fecal Coli.	NO ₃ /NO ₂	NH ₃ /NH ₄ ⁺	pH	1982 Overall Water Quality
PASSAIC/HACKENSACK BASIN											
Upper Passaic River	S	S*	S	S	S	S	I	S	S	S	Poor/Fair
Mid-Passaic River	S	S*	S	S	S	S	S	S	S	S	Poor
Mid-Passaic Tributaries											
Rockaway River	S	S*	S	S	S	S	I	S	S	S	Poor
Whippany River	S	S*	S	S	S	S	D	S	S	S	Poor/Fair
Ramapo River	S	S*	S	S	S	S	S	S	S	S	Fair
Pompton River	S	S*	S	-	D	-	D	S	S	-	Fair
Lower Passaic River	S	S*	S	S	S	S	S	S	S	S	Poor
Hackensack River	S	S	S	S	S	S	S	S	S	S	Poor

Legend

- I = Improving
- D = Declining
- S = Stable/Unchanged
- = Insufficient data to determine trend
- * = Exceeded State Water Quality Standard 50% or more of the time
- ** = Derived from 208 Areawide Water Quality Management Plans
- *** = Classification may be based on water quality parameters other than the ten presented here.

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The lower Hackensack is noted for its large expanses of tidal marshes (known as the Hackensack Meadowlands) that contain a great variety of terrestrial and aquatic life. However, the community make-up found in the Meadowlands is largely pollution tolerant organisms, despite indications of recent improvements in the water quality and the diversity of organisms found (Mattson and Vallario, 1976).²

Intensive survey data conducted by the NJDEP in 1970 (summer) indicate DO concentrations in violation of State standards for both TW-2 and TW-3 waters in the Hackensack River Basin (See Figure 2). Initially water quality standards are met below the Oradell dam. Approximately 2 miles below the dam degradation occurs until the tidal flushing affect becomes more effective. The poorest Hackensack River water quality occurs slightly north of Overpeck Creek to slightly south of Berry's Creek. Low dissolved oxygen profiles are typical in the section between these two creeks.

Five-day BOD, organic nitrogen, and phosphorus levels are also high in the section between Overpeck Creek and Berry's Creek. Historical data from the above mentioned intensive survey indicate BOD₅ values in tidal waters ranging from approximately 1.0 mg/l to 8.0 mg/l. Recent data confirm these results.¹ Historical data from the intensive survey indicate high levels of phosphorus ranging from approximately 1.0 mg/l to 5.0 mg/l and nitrate levels ranging from .004 mg/l to 2.3 mg/l.

Recent data indicate un-ionized ammonia levels frequently exceed EPA recommended levels of .02 mg/l for fresh water. During the drought (low flow) period of mid 1980 to mid 1981, elevated un-ionized ammonia concentrations were most severe in the Passaic, Hackensack and Raritan River Basins as compared to the rest of the State.

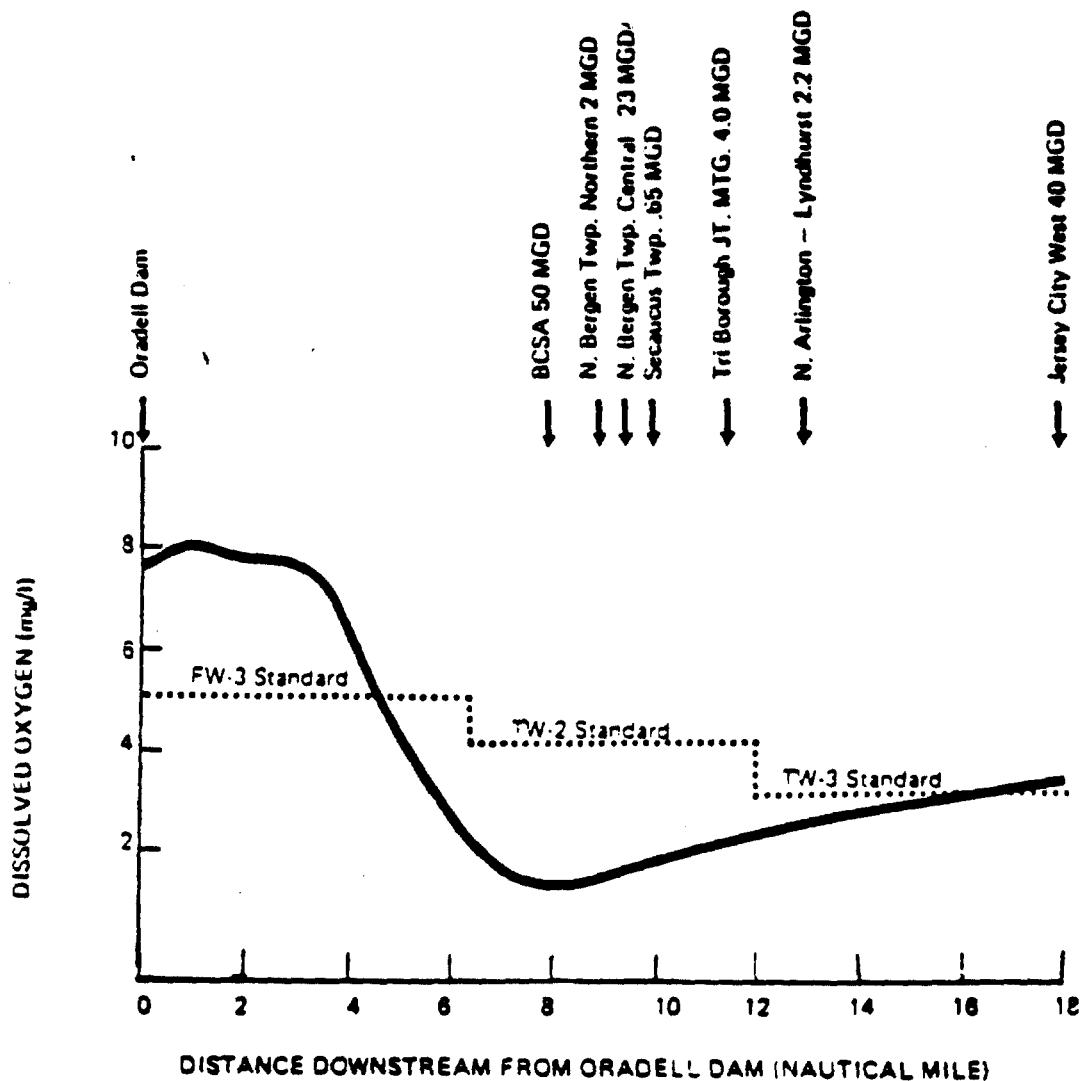
Large point source loadings, accentuated by poor flushing of the waters by tidal actions, are the primary cause of degradation of water quality in the lower Hackensack River. BOD was found to be 2 times greater, phosphate 14 times greater, and nitrogen 10 times greater from point sources than from non-point sources. The Bergen County Utilities Authority (BCUA) was by far the largest contributor of the point source loadings.² Notwithstanding the BCUA, most municipal and industrial wastewater loads to the Hackensack River are discharged to tributary creeks as indicated in Figure 3. Excluding the Bergen County Sewer Authority, Jersey City, and Kearney treatment plants, 62 percent of the BOD₅ loading of the remaining municipal and industrial discharges is discharged to Berry's and Penhorn Creeks with each creek receiving about equal BOD₅ loads.³

During the November 3, 1972 spatial survey conducted by Hydrosience, Inc., samples of the major tributaries were collected and analyzed for BOD₅, dissolved oxygen, chlorides, nitrogen, and phosphorus. The sampling station locations are shown in Figure 3 and results tabulated in Table 4. Although tributary water quality data are difficult to interpret quantitatively, the zero dissolved oxygen concentrations in Berry's and Penhorn Creeks indicated the effect of wastewater discharges into these water courses.

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FIGURE 2

1970 DISSOLVED OXYGEN CONDITIONS HACKENSACK RIVER

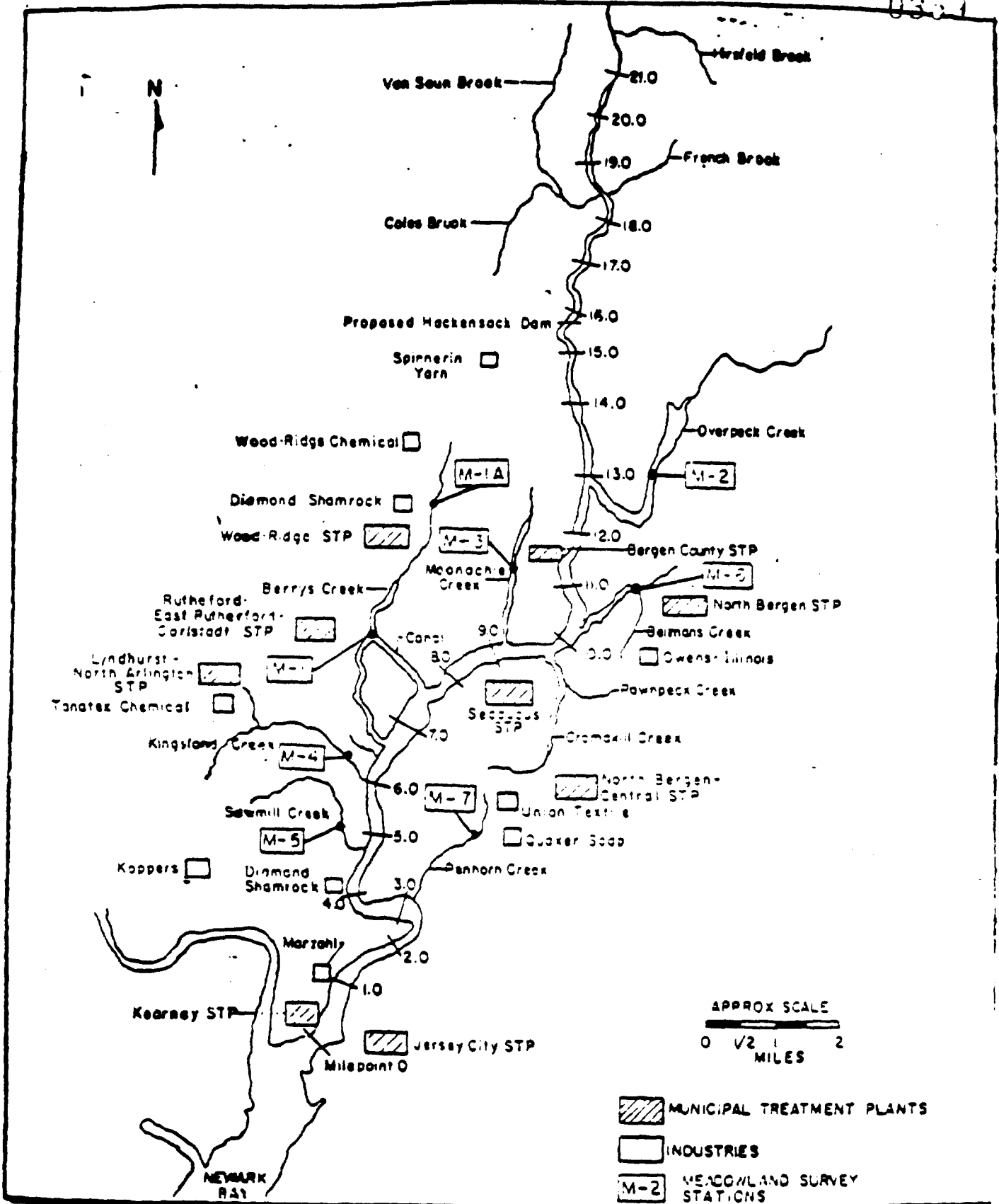


Source: Teledyne 1973

Summer 1970 Conditions

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FIGURE 3



HACKENSACK BASIN - POINT SOURCES

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TABLE 4

SUMMARY OF WATER QUALITY IN TRIBUTARY CREEKS
(November 3, 1972)

Station	Creek	Chlorides mg/l	BOD ₅ mg/l	D.O. mg/l	Org-N mg/l	NH ₃ -N mg/l	NO ₂ -N mg/l	NO ₃ -N mg/l	Total mg/l
M-1	Berrys	4,700	4.3	1.1	1.14	4.95	0.06	0.5	1.56
M-1A	Berrys	-	-	0.0	-	-	-	-	-
M-2	Overpeck	700	8.6	5.6	2.52	1.05	0.06	0.7	0.17
M-3	Noonachie	70	16.8	5.4	0.72	0.22	0.05	<0.5	<0.1
M-4	Kingsland	5,800	2.8	4.1	2.09	0.99	0.07	0.6	0.89
M-5	Sawmill	6,050	2.2	3.0	3.30	1.38	0.08	0.6	0.93
M-6	Bellmans	75	4.2	7.2	<0.01	0.60	0.18	1.7	0.40
M-7	Penhorn	110	>26	0.0	1.16	11.74	0.02	<0.5	1.17

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The NJDEP classified the waters of Berry's Creek as TW-2. Water quality in the Creek is variable and frequently does not meet the current water quality standards. Five-day BOD, nutrient concentrations, and coliform counts are very high. Oil and grease slicks are routinely observed. As previously mentioned, DO is absent from the water for several days each month.⁵

In 1973-74, Jack McCormick and Associates, Inc. conducted a water quality surveillance program of Berry's Creek. This study indicated that BOD, metals, and bacteria originate from discharges upstream of the sports complex site. Analysis of nitrogen data shows organic nitrogen decreasing and ammonia nitrogen increasing in the downstream direction. This indicates that nutrients discharge upstream of the sports complex. Oil and grease discharges originate from inactive landfill sites in the area.

Berry's Creek has been the site of massive mercury contamination. Significant levels of mercury contamination were observed in the creek waters in 1974 shortly after demolition of a factory upstream of Paterson Plank Road. Soils on the factory site appeared saturated with a mercury-containing oil. Mercury laden leachate from this site may enter the creek for several decades. Marsh sediment samples were taken in areas adjacent to the creek in 1972. Concentrations of mercury in the samples were unusually high. Samples taken again in 1974 verified these findings. These marsh sediment samples contained mercury concentrations ranging from 40 to 4,000 times higher than anticipated.⁵ It is estimated that several tons of elemental mercury is currently residing in the Berry's Creek ecosystem. However, tidal action appears to have trapped this contamination within the Berry's Creek Area.²

The industries discharging to Berry's Creek include:

- Arsynco Inc. - Carlstadt
- Diamond Shamrock Corp. - Carlstadt (cooling water)
- Sika Chemical Corp. - Lyndhurst (cooling & sanitary)
- Yoo-Hoo Beverage - Carlstadt (cooling water)
- Howmedica Inc. - Rutherford (cooling water)
- U.S. Printing Ink - East Rutherford (cooling water)
- Cosan Chemical Corp. - Carlstadt (cooling water)
- Randolph Products Co. - Carlstadt
- Technical Oil Products Inc. - Carlstadt (cooling water)
- Tec Cast - Carlstadt (drainage ditch to Berry's Creek; process waste)
- Stranahan Foil - South Hackensack (cooling water)

The NJDEP conducted a survey in 1982 to determine if there were any potential health hazards directly attributable to the Joint Meeting facility. The survey has identified 22 different pollutant compounds which are considered to be carcinogens, mutagens, or teratogens. The conclusion of this study indicates a widespread environmental impact on the receiving water and a potential human health threat in the vicinity of the plant with chronic exposure. Rutherford, New Jersey was the site of a cancer cluster (origin undetermined) in 1978. A recent letter (December 23, 1982) from the NJDEP Office of Cancer and Toxic Substances Research (OCTSR) recommended "from the viewpoint of protecting both human health and the environment" that the Joint Meeting Sewage Treatment Plant be quickly and adequately addressed. "The surface water discharge should be eliminated as soon as possible."